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ABSTRACT

In a university environment, the library can benefit from interest in the digital future on the part of other concerned groups. Computer science departments are natural partners in the development of digital libraries. Professional societies, for-profit companies, and foundations are also potential sources of support. Cornell University Library (New York) has worked closely with a variety of interested individuals and organizations in providing access to and preservation of digital materials. This paper describes the evolution of some of those projects and the resulting innovations and technology enhancements. Projects covered include: The Mathematics Book Collection; TEEAL (The Essential Electronic Agricultural Library); ICE (Internet Connections for Engineering); Project Nomad, a research project in which students in two experimental courses are each issued a laptop computer with a wireless modem; Project TULIP, a cooperative research project to test networked delivery and use of electronic journals; a grant titled Security and Reliability in Component-Based Digital Libraries; NEEDS (National Engineering Education Delivery System); and Project Euclid, a pilot project developed to help independent mathematics and statistics journals by setting up an infrastructure that will empower them to publish on the World Wide Web. (Author/MES)

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Cooperative development of the digital library: identifying and working with potential partners

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Abstract

In a university environment, the library can benefit from interest in the digital future on the part of other concerned groups. Computer science departments are natural partners in the development of digital libraries. Professional societies, for-profit companies, and foundations are also potential sources of support. Cornell University Library has worked closely with a variety of interested individuals and organizations in providing access to and preservation of digital materials. This paper describes the evolution of some of those projects and the resulting innovations and technology enhancements.

Developing a collection of material in electronic format, loosely labeled by many as a digital library, is a financial and technological challenge for librarians. In an increasingly digital environment it becomes ever more important that we maintain our position in our parent organizations and in society by keeping up with and even leading the digital revolution. There are potential allies and sources of support within our organizations and among our colleagues in industry, research and government. Most colleges and universities have expertise among faculty and staff that librarians can leverage. By keeping in touch with the research and teaching interests of our users we can sometimes develop projects of mutual interest. Computer-related companies and library vendors need partners in developing and testing their products. Both private and public granting agencies are interested in furthering the development of digital libraries. While making initial contact with these people and agencies can be

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challenging, perseverance often pays off. Success eventually builds on success and contacts grow over time.

In the academic structure, libraries function across departments. The library is a horizontal support unit that joins the vertical system comprised of colleges and departments. Departments are self-contained and often deal primarily with their own colleges. By communicating with researchers and teachers, and also with each other, librarians can connect many individuals, learn from those individuals, and synthesize the interests of the disparate groups. Cornell University is often described as a loose federation of colleges. The library reflects that amalgamation while connecting the federation unique ways. There are nineteen libraries at Cornell, ranging in size and complexity. Individual colleges fund some libraries, while others are centrally supported but cover specific disciplines. For example, in science and technology, the Engineering, Mathematics, and Physical Sciences Libraries are centrally funded while Mann Library (agriculture and life sciences), the Veterinary Library, the Medical Library, and several others are supported by individual colleges or departments. All the libraries cooperate in developing the Cornell University digital library, working together across disciplines, sharing costs and expertise, and building on each other's projects.

In the same way that libraries have shared resources to develop paper-based collections, libraries are able to cooperate in the development of digital libraries. An increasing number of requests for proposals from foundations and public agencies indicate a preference for joint proposals. The generous spirit of cooperation among libraries can easily be extended to the digital world.

Librarians are well positioned to lead the transition to electronic material. We have a very long tradition of service and preservation, have very unique skills that are not found elsewhere in the digital world, and are the keepers of the collections that interest users. Ideas for digital library projects and partnerships can be developed by considering three areas: the library as a collection of materials, the library as a laboratory, and the library as a place where skills are available that are uniquely suited to information storage and retrieval.

Library as Collection

Librarians have been building, archiving, and making accessible collections of information for centuries. Collections consist of both retrospective and current materials. Because current materials are usually protected by copyright, it is less troublesome to digitize retrospective collections that are in the public domain. There is always the possibility, however, of working with the copyright holder, publisher or author to produce a digital product. Cornell University Library has undertaken to work with materials in both categories.

Because Cornell University Library has an exceptional collection of science, technology, and agriculture materials we have been involved in several digitization projects focusing on those collections. The results of some of these projects have been compiled on a single web site (http://cdl.library.cornell.edu). One of these projects, The Mathematics Books Collection, had its beginnings in the early 1990s. The mathematics librarian identified almost six hundred historical mathematics monographs that were scanned as part of a joint study with the Xerox Corporation, which was interested in developing ways to preserve brittle books. The project ended but the scanned images are available to anyone through the Web. The Library also provides bound copies of these out-of-print books for a fee to any interested individuals or organizations (http://www.math.cornell.edu/~library).

Cornell's Mann Library is working with the Rockefeller Foundation to develop TEEAL- the Essential Electronic Agricultural Library. This "Library in a Box" provides complete text images of 130 of the most important scholarly journals (selected by six hundred scientists) in agriculture-related areas covering 1993-1996. Data are distributed on CD-ROM and annual updates are issued. TEEAL staff worked with publishers to solve copyright issues, which are to some degree simplified because TEEAL is available only to developing countries. While the basic price of $10,000 US seems high, it is less than 3 percent of the actual cost of subscriptions for four years. TEEAL staff have also identified potential donors that might be willing to assist in purchasing the package.

In April 2000, Mann Library received a grant from the U. S. National Endowment for the Humanities to work with libraries in eight states to preserve books, family farm memoirs, land transactions and other published materials that depict the history of U. S. agricultural and rural life. Much of this literature had been printed on acidic paper and is now deteriorating. While that project deals with materials on a state level the Core Historical Literature of Agriculture project collects and makes available in digital format material of national interest. This project has roots in The Making of America, the same endeavor that involved scanning mathematics books. These materials will soon be available on the Web.

Library collections are not always paper-based. A few years ago Cornell's engineering librarian secured funding from the Council on Library Resources to compile and make available a broad catalog of Internet-based engineering resources: Internet Connections for Engineering (ICE) (http://www.englib.cornell.edu/ice/). The list continues to be maintained by engineering reference librarians. When Cornell University Library catalogers were identifying materials to include in OCLC's Cooperative Online Resource Catalog (CORC) pilot project, the ICE collection of Web sites was an obvious resource. The pages are now cataloged and linked through our public catalog.

Library as Laboratory

The physical library is a place where people who use and respect information gather. Researchers, vendors, and professional organizations are interested in their behavior and sometimes will provide equipment, software, databases or other materials to be tested in the library, by librarians or by library users.

Project Nomad (http://www.nomad.cornell.edu) is a cooperative research project involving Cornell's Department of Computer Science and the Department of Communication, with support from the Intel Corporation. The project support team includes representatives of these two departments as well as the Engineering Library and Mann Library. Students in two experimental courses are each issued a laptop computer with a wireless modem. A network of transceivers has been installed across the engineering area of campus, including the Engineering Library. Students are able to use their laptops in many buildings as well as in open space between the buildings. Their use of the laptops is monitored to record how this ubiquitous access to wireless networks affects their computer use. One result is certain - the students are very reluctant to return their laptops at the end of the semester. Because of this finding a proposal is under development to provide students with the option of renting their computers with a goal of eventually owning them. By participating in this project the Engineering Library is able to provide any usr who has a wireless modem the opportunity to connect to campus resources.

In the early 1990's Elsevier Science, a major publisher of science journals, asked Cornell University Library to participate in Project TULIP. Libraries at nine institutions were part of this cooperative research project to test networked delivery and use of electronic journals. The project goals were to determine the technical feasibility of networked distribution to and across a variety of institutions, to understand and develop new economic models, and to study user behavior when dealing with electronic journals. As project participants Cornell's Engineering and Physical Sciences Libraries were able to provide users with free access to electronic versions of Elsevier's materials science journals and to have input into the resulting product. While the TULIP prototype was later abandoned in favor of Web delivery, the project data were of significance to the publishers.

Unique Skill Set

The unique training and values held by librarians are even more important than collections or libraries to those who are interested in developing digital products. We have an established tradition of classifying information along with a commitment to making that information retrievable. We take very seriously intellectual property rights and fair use aspects of relevant legislation. Our dedication to user satisfaction and our knowledge of preservation issues make us important partners in the digital revolution.

The transfer of these very skills to a digital environment is the focus of a grant from the U. S. National Science Foundation to Cornell University. Responsibility for the grant titled Security and Reliability in Component-based Digital Libraries is shared between members of the Computer Science Department and the Library.

This grant examines how particular contributions of librarians -reliability to ensure information is where and when people want it, security to ensure privacy of users and intellectual property rights of content creators, and preservation to ensure longevity of the intellectual content for future generations- can be moved to the digital environment. These issues that have been to a great degree solved in the paper and, to a lesser degree, the hybrid environment. But we do not yet know what will be best practice in the purely electronic setting.

Cornell's Engineering Library is represented in The Synthesis Coalition (http://www.synthesis.org). This group of eight diverse institutions was funded by the U. S. National Science Foundation to design, implement and assess new approaches to undergraduate engineering education that emphasize multidisciplinarity, teamwork and communication, hands-on and laboratory experiences, open-ended problem formulation and solving, and examples of standard practices from industry. NEEDS -The National Engineering Education Delivery System (http://www.needs.org) - is the distributed architecture developed by Synthesis to enable new pedagogical models based on Internet-mediated learning environments. NEEDS catalogs courseware and other instructional software developed nationally and internationally to provide a resource where both instructors and learners can search, access, and download educational materials over the World Wide Web. In addition, NEEDS also supports a multi-tier courseware evaluation system. Needs software was first made available on a library catalog and continues to rely on librarians to maintain its indexing scheme.

The commitment of librarians to preservation is well respected by publishers. We have common concerns in this area, particularly regarding the archiving of

electronic journals. Scientific societies also have as a mandate the preservation of scientific information. In a paper environment societies were able to depend on libraries to maintain archives of their journals. As we begin to rely more heavily on electronic journals the archiving issues become challenging. Current thinking is that redundant archiving, data stored at several sites, will be a necessary component of digital archive. This is an ideal opportunity for libraries and societies to collaborate. Cornell University Library is currently a mirror site for the Zentralblatt MATH Database (http://euclid.library.cornell.edu/). We are completing discussions with the American Physical Society to mirror their journals. Beyond mirroring, we are looking at developing digital archives in partnership with and other publishers.

Cornell University Library recently received a grant from the Andrew Mellon Foundation to support Project Euclid (http://euclid.library.cornell.edu/project). This is a pilot project developed to help independent mathematics and statistics journals by setting up an infrastructure that will empower them to publish on the Web and to increase their visibility through a combined online presence. The Project Euclid site will support the entire span of scholarly publishing from preprints to the distribution of published journals. It will also provide journal editors with a toolkit designed to streamline their editorial and peer review processes and publish their issues in a timely and cost-effective manner.

Project Euclid grew out of the Mathematics Books Collection experience as well as the experience of mirroring the Zentralblatt MATH Database. The Mellon Foundation provided a relatively small planning grant that enabled the library to hold focus groups and meet with groups of journal publishers to assess what the needs are specific to mathematics journal publishing. As a result of those discussions Duke University Press is now a partner in the development of the project and several mathematics and statistics publishers have expressed interest in participating.

Connections and Creativity

The activities described above do sometimes take away from the traditional work that librarians have done in the past and continue to do. It is unlikely that additional staff will become available so librarians are faced with the need to make decisions about their priorities. Some processes need to be judiciously revised or even abandoned in order to take on these new projects. In some cases if adequate funding becomes available temporary replacement staff can be hired to help either with the new project or the traditional tasks.

The incentives for libraries to participate in developing the digital future are several. The first, and perhaps most important, is that by participating librarians will have input to future direction. Librarians must be at the table and full participants so our values and skills are represented. Another related incentive is the relevance factor. If libraries do not find ways to include digital materials among their holdings they will become obsolete repositories of books rather than sources of information. This is a particular problem in science and technology where currency is so important.

Identifying projects and potential partners can be challenging and require a great deal of perseverance. Connections and creativity are the basics that eventually produce partnerships. Relationships with faculty are important along with constant mindfulness of how the library can work with faculty on their projects. Increasingly, software and other vendors that in the past talked only with faculty are finding that librarians are useful contacts. Librarians have had positive results from sharing their proposals with sales representatives from

computer companies.

There are many organizations interested in what libraries do, particularly in a Web-based world, which is often viewed as an information-based world. At professional meetings or, sometimes in newsletters and magazines, publishers and other organizations may indicate that they are looking for development partners. It is useful to look and listen for phrases such as "seeking partners to develop" or "initiating a pilot project." A first step is to identify the key players in a group or organization, and make oneself and one's library known to them. A simple question such as "How can we work together?" can begin a long and informative conversation. A group of libraries sometimes can be more effective than any single library. Forming a consortium, or joining one that has already been established, can be an effective way to pool resources.

In addition to being creative in establishing contacts, it is important that the library is perceived as a creative organization. Time, effort and flexibility are all factors in developing that image. Rewarding risk-taking behavior among staff encourages a fairly steady flow of new ideas. Another aspect involves permitting staff to fail and providing them with ways to save face when the results of risky plans are not positive.

It is important to keep in mind that success builds on success but the definition of success can be very subjective. Success can be defined as taking a chance and developing a creative idea. Even when projects are not funded or continued they can be viewed as learning experiences and can later serve as the basis for further development. An unproductive attempt can be reworked for new partners or at the very least used as a fuel to spark other ideas. For example, Dissertations Available on Internet Systems (DAISy) was a multi-library project to improve access and availability of dissertations to the academic community. The participating groups, including Cornell's Engineering Library, planned to share images of engineering dissertations via the Web. The pilot was developed in 1993. After a good start the project did not continue because of the complexity of digital processing at the time, but it has become the foundation of Cornell University Library's current thinking about digital dissertations. The time spent on DAISy is not wasted time although the project did not live past the pilot.

One of the many positive aspects of the digital environment is the internationalization of the playing field. Requests for joint proposals from libraries in different countries are more frequent. People who could not travel can now visit each other's libraries electronically and work together to identify potential projects and partners.

Cornell University Library has been successful in identifying partners and sources of financial support for many projects, particularly in science, technology and agriculture. Much of the success is due to the nurturing of relationships with individuals and organizations and to an environment in the library that supports creative risk taking. It is a simple formula that takes time to develop but leads to great professional and organizational satisfaction.

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